

## **REMARKS**

Claims 1, 5-7 and 10 are pending in the application, Claim 11 has been deemed withdrawn by the Examiner. Claim 1 has been amended by replacing the general formula by the full names of the beta-glucans given in paragraph [0019] of the application. For reasons as set forth below, Applicants submit that reconsideration and allowance of the claims is appropriate.

### **35 U.S.C. §103 Claim Rejections**

#### ***Kong et al. in view of Shoji et al***

Claim 1, 5-7 and 10 are rejected under 35 U.S.C. 103(a) by the Examiner as being allegedly unpatentable over Kong et al. in view of Shoji et al. This rejection is respectfully traversed for the reasons as stated below.

As correctly quoted by the Examiner, Kong et al. does not disclose an *"unbranched saccharide having all the characteristics recited in the instant claims or a method of making said saccharide"*.

According to the Examiner, *"Shoji et al. discloses the isolation of laminaripentaose, which is the beta-glucan pentasaccharide of the claimed invention. This demonstrates that one skilled in the art is able to obtain this unbranched pentasaccharide"*.

However, Shoji et al. discloses the synthesis of p-octylphenyl laminaripentaoside peracetate using as a starting material *"acetylated  $\alpha$ -laminaripentaose"* (emphasis added, col.39, line 18). The intermediary product obtained has a *"reducing terminal  $\alpha$  isomer position-1"* (emphasis added, col.39, lines 45-46).

Accordingly, the glucans which are used and obtained by Shoji et al. are not "beta-glucans" in the sense of the claimed invention. Indeed, the beta-glucans of the invention only contains beta glycosidic bonds, as explicitly mentioned in pending claim 1.

The skilled person, having knowledge of Shoji et al., would thus have no indication for obtaining the beta-glucans according to the invention.

**Kong et al. in view of Katsuraya et al. 1**

Claim 1, 5-7 and 10 are rejected under 35 U.S.C. 103(a) by the Examiner as being allegedly unpatentable over Kong et al. in view of Katsuraya et al. 1. This rejection is respectfully traversed for the reasons as stated below.

As correctly quoted by the Examiner, Kong et al. does not disclose an *"unbranched saccharide having all the characteristics recited in the instant claims or a method of making said saccharide"*.

According to the Examiner, Katsuraya et al. 1 discloses *"a synthetic method involving the acetylation and glycosyl modification of oligosaccharides including laminaripentaose"*.

However, the method disclosed in Katsuraya et al. 1 leads to oligosaccharides comprising  $\alpha$  and  $\beta$  glycosidic bonds. It is for example mentioned that *"Acetylation of maltoheptaose with sodium acetate gave a  $\beta/\alpha$  ratio in the range of 2.4-4.8, but potassium acetate gave the highest  $\beta/\alpha$  ratio (6.4)"* (p.52, 7<sup>th</sup> paragraph). It is also shown in table 1, page 54, that the acetylation leads to laminaripentaose L5 comprising  $\alpha$  and  $\beta$  glycosidic bonds ( $\beta/\alpha$  ratio of 3.0 or 3.8).

Accordingly, the glucans obtained in the Katsuraya et al. 1 reference are not "beta-glucans" in the sense of the claimed invention. Indeed, the beta-glucans of the invention only contains beta glycosidic bonds, as explicitly mentioned in pending claim 1.

The skilled person, having knowledge of Katsuraya et al. 1, would thus have no indication for obtaining the beta-glucans according to the invention.

**Kong et al. in view of Katsuraya et al. 2**

Claim 1, 5-7 and 10 are rejected under 35 U.S.C. 103(a) by the Examiner as being allegedly unpatentable over Kong et al. in view of Katsuraya et al. 2. This rejection is respectfully traversed for the reasons as stated below.

As correctly quoted by the Examiner, Kong et al. does not disclose an *"unbranched saccharide having all the characteristics recited in the instant claims or a method of making said saccharide"*.

According to the Examiner, Katsuraya et al. 2 discloses that *"laminara-oligosaccharides having five or more 1,3-beta-glucosyl subunits can be made by chemical hydrolysis or acetolysis of curdlan"*.

However, the method disclosed in Katsuraya et al. 2 leads to oligosaccharides comprising  $\alpha$  and  $\beta$  glycosidic bonds. This is for example shown in table 2, page 6696: the acetylated oligosaccharides have a  $\beta/\alpha$  ratio from 3.4 to 3.9.

Accordingly, the glucans obtained in the Katsuraya et al. 2 reference are not "beta-glucans" in the sense of the claimed invention. Indeed, the beta-glucans of the invention only contains beta glycosidic bonds, as explicitly mentioned in pending claim 1.

The skilled person, having knowledge of Katsuraya et al. 2, would thus have no indication for obtaining the beta-glucans according to the invention.

### ***Kong et al. in view of Katsuraya et al. 3***

Claim 1, 5-7 and 10 are rejected under 35 U.S.C. 103(a) by the Examiner as being allegedly unpatentable over Kong et al. in view of Katsuraya et al. 3. This rejection is respectfully traversed for the reasons as stated below.

As correctly quoted by the Examiner, Kong et al. does not disclose an "*unbranched saccharide having all the characteristics recited in the instant claims or a method of making said saccharide*".

According to the Examiner, Katsuraya et al. 3 discloses that "*laminaritetraose and laminaripentaose can be obtained by hydrolysis of curdlan*".

However, the method disclosed in Katsuraya et al. 3 leads to oligosaccharides comprising  $\alpha$  and  $\beta$  glycosidic bonds. This is explicitly mentioned in the abstract: " $\beta/\alpha$  ratio 3.2-3.8)".

Accordingly, the glucans obtained in the Katsuraya et al. 3 reference are not "beta-glucans" in the sense of the claimed invention. Indeed, the beta-glucans of the invention only contains beta glycosidic bonds, as explicitly mentioned in pending claim 1.

The skilled person, having knowledge of Katsuraya et al. 3, would thus have no indication for obtaining the beta-glucans according to the invention.

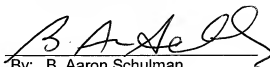
### **Conclusion**

Neither Kong et al., Shoji et al., nor Katsuyara et al. 1, 2 or 3 discloses or suggests how to obtain  $\beta$ -D-glucopyranosyl-(1 $\rightarrow$ 3)- $\beta$ -D-glucopyranosyl-(1 $\rightarrow$ 3)- $\beta$ -D-glucopyranosyl-(1 $\rightarrow$ 3)- $\beta$ -D-glucopyranose (laminaritetraose) or  $\beta$ -D-glucopyranosyl-(1 $\rightarrow$ 3)- $\beta$ -D-glucopyranosyl-(1 $\rightarrow$ 3)- $\beta$ -D-glucopyranosyl-(1 $\rightarrow$ 3)- $\beta$ -D-glucopyranose (laminaripentaose). Thus, one skilled in the art having knowledge of Kong et al., in view of Shoji et al. or any one of Katsuyara et al. 1, 2 or 3, would never have been able to make the particular beta-glucans of claim 1. Accordingly, the claimed invention is thus clearly not obvious in light of these references.

In view of the above arguments, Applicants submit that the claims are patentable over the cited references, and that the application is now in condition for immediate allowance. Consideration of the foregoing arguments and prompt allowance of the above claims are thus respectfully requested.

Respectfully submitted,

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